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STATEMENT OF MR. B. E. FERNOW, CHIEF OF THE DIVISION OF
FORESTRY, DEPARTMENT OF AGRICULTURE.

COMMITTEE ON AGRICULTURE, HOUSE OF REPRESENTATIVES,
Washington, D. C., February 16, 1895.

The CHAIRMAN. Professor Fernow is present this morning, and has been here twice this week at the request of members of the committee. He desires to present a brief statement in regard to the following bills pending before the committee:

"H. R. 8389. To amend paragraph one of section one of an act approved August thirtieth, eighteen hundred and ninety, entitled 'An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provision of an act of Congress approved July second, eighteen hundred and sixty-two.'"

"H. R. 8390. To establish and maintain a national school of forestry."

MR. FERNOW. Mr. Chairman and gentlemen of the committee, this legislation for the establishment of forestry courses at the agricultural colleges and of a national school of forestry in connection with the Department of Agriculture has in view the promotion of a rational use of our forest resources.

The forest resource of the United States is the largest producer of values, with only one exception—the soil itself. Agriculture the twin sister of forestry, produces larger values, but only as a result of hard human labor, while the forest, without much labor, except the mere harvesting by nature's unassisted efforts, yields the enormous quantities of material which we now use annually. With an annual output exceeding in value \$1,000,000,000, the forest resources yield twice the amounts that our mines, silver, gold, coal, iron, copper, zinc, and of whatever description, produce annually. Even if, instead of the value of the wood article ready for marketing, we refer only to the stumpage, i. e., the royalty which the wood consumer pays to the land owner for the privilege of taking the valuable material from the land, we will find it ten times as large as the royalties paid for coal and twenty-five times as large as those paid for iron ore. Nay, even compared with farm rents the stumpage value of an acre of well-grown forest in Michigan or Wisconsin exceeds its farm value under present conditions.

Hitherto this great resource of wealth has been worked like a mine; the accumulation of centuries have simply been quarried. Worse, the forest has been mined under an irrational robbing system; the pay ore has been taken out and the tailings have been dumped on the rest, thus preventing a fuller exploitation of the same. Or we may compare the methods pursued to those of a butcher, who kills the cattle and sells the meat, looking around for new herds to slaughter, which he can not do long, unless somebody maintains a herd for breeding.

In this manner, slaughtering the timber which has been stored through centuries without looking toward reproduction, we have reduced our supplies to such a degree that we are now cutting into our capital to the extent of 50 to 75 per cent of our consumption, probably only 25 per cent of our annual cut being represented by annual new growth. Our statistics are of the crudest, but they need not be much refined to make us appreciate the necessity of a change in our method of treating this resource. That such a change must be made in good season and long before an actual giving out of supplies is at hand will be appreciated when we realize that the trees which we are cutting now are mostly centuries old; the white pines which our Michigan and Wisconsin lumbermen deem fit for sawing began to grow in the times of the French and Indian wars; the yellow pines, the pride of the Southern lumberman, must be 200 years old and more to satisfy him—and the spruces of Maine do not furnish much saw timber before that age, while the big tulip trees and cypress, and many of the oaks of the South, not to speak of the magnificent giants of the Pacific, count their years by many centuries.

This time element is one of the most important factors to be kept in view in discussing this problem. As we are told to prepare for war in times of peace, so we should prepare for famine in times of plenty.

So far as I can figure, considering the present condition of our forest resources and our present rate and methods of using them, they will be exhausted long before

another century or perhaps half century has passed. If methods are not changed the reduction in desirable wood material will in fact be felt considerably before the next fifty years, i. e., before a new crop could mature.

It would, of course, be childish to think that we shall stop or even materially reduce wood consumption until the necessity is at our very door. It is the experience of the world that in spite of substitutes and thereby changes in the use of wood materials, the total consumption does not abate; the material is too useful and indispensable to civilization.

Now, it seems to have been entirely overlooked in the United States that the timber growing on an acre of land is as much a crop, or may be treated as such, as a crop of wheat or corn; that timber growing may be carried on as a business, requiring skill and knowledge, as well as timber cutting; nay, more, that in our natural forests timber cutting and timber growing can be carried on simultaneously; that by the mere judicious use of the ax in the old timber a new crop of even better quality and larger quantity per acre can be reproduced.

Under present methods the lumberman culls out the useful species and leaves the ground to the inferior kinds, which by their very presence prevent the natural reproduction of the better kinds, so that while we have still larger areas of woodland, their commercial value—as a resource of valuable material—has been destroyed; to be sure there are trees and wood growing on them, but not to useful purpose. The forester uses his crop even more closely than the lumberman, but he first culls out and disposes as best he may of the inferior kinds, the weeds, and then cuts the better kinds of timber in such a manner, and with such knowledge of the requirements of each species, that they will reproduce themselves in superior quality. It is then possible, by the mere manner of cutting to secure the reproduction of new crop and no resort to planting is necessary. In order, however, to do this successfully, special knowledge and skill are needed, which the lumberman does not possess, and it is an opportunity of acquiring this kind of technical knowledge that the proposed legislation is to secure. To be sure, economic conditions in some parts of our country will probably not as yet permit the application of intensive methods, but in other parts even now the owners of woodlands would gladly avail themselves of the expert advice of skilled foresters if such could be had.

I may only briefly mention other interests connected with a rational use of our forest resources which merit the attention of statesmen and which will be subserved by the proposed legislation.

Due to inconsiderate clearing, thousands of square miles, notably in the Southern States, have been eroded to such an extent as to be practically useless for agriculture, and their reclamation can be accomplished only by restoring their original forest growth. It is estimated that in the State of Mississippi alone 10 per cent of the uplands is lost annually by erosion. In connection with this washing of the soil, due to improper removal of the forest cover, we experience annually increasing floods, which swell the amounts to be appropriated for river and harbor bills.

While such floods occur largely on account of uncontrollable climatic and topographic conditions, they are undoubtedly intensified and made more frequent by the destruction of the forest floor, which, with the accumulation of litter and undergrowth, impedes the rapid running off of flood waters. With the forest removed or the forest floor destroyed by fire the waters run off rapidly and carry the soil and debris into the rivers, narrowing their channels and increasing the flood dangers.

Finally, our immense agricultural region in the West suffers from a lack of forest growth. Not only is the maintenance of the forest cover on our Western mountain ranges as a means of water storage for irrigation purposes essential, but in the plains and prairies the planting of shelter belts as an amelioration of the climate in breaking the force of drought-bringing winds has long been recognized. The Government very generously encouraged such forest planting, but, owing to lack of technical skill and knowledge, the attempts which have been made have largely resulted in failures.

Everywhere, then, we see that knowledge is wanting, and it is to supply this want that the Government is now called upon to exercise its educational function.

The agricultural colleges being ostensibly created in the interest of agriculture, it is natural that they should also be required to devote some attention to the development of forestry, which, as I have stated, is the twin sister of agriculture, both being engaged in deriving valuable crops from the soil. Many of the fundamental sciences which underlie agriculture must be studied by the forester and we find these colleges partly, at least, prepared to furnish this fundamental instruction, which needs only to be extended and made applicable to forestry. In fact, several of the colleges have already anticipated in a degree the need of instruction in forestry. According to a canvass which I have lately made seventeen of the agricultural colleges have introduced forestry courses; of these, ten make the course compulsory and six elective; two of them furnish courses through two semesters. In addition to these, eight furnish occasional lectures on the subject.

The character of this instruction is at present, to be sure, very rudimentary and primitive and with very few exceptions hardly systematic or sufficiently technical; a mere byplay, as it were, an intimation rather than something in this direction is needed. This is due to the fact that the instruction is left to the professors of horticulture or botany, who are incapable for two reasons to do justice to the subject. In the first place, these professors are fully occupied with their own proper subjects of teaching and in addition mostly with the engrossing requirements of experimental work, so that they can not give much time or thought to forestry; secondly, they are not educationally prepared to teach the subject, for while the horticulturist or botanist is acquainted with at least one of the basal sciences of forestry, namely, plant physiology, he treats of trees from one point of view, while forestry treats of trees from an entirely different point of view. The horticulturist has to do with the single tree, be it for its fruit or its landscape effect and the methods he pursues are adapted to this purpose; the forester has to deal with masses, and his methods are absolutely different from the horticulturist. Besides, there are many technical details necessary to the proper management, harvesting, etc., of a forest crop, which are entirely foreign to the horticulturist. The gentlemen, themselves, who are carrying on these courses realize better than anybody else this difference and have in correspondence frequently admitted the necessity of establishing special chairs of forestry if we desire a useful technical education which is to fit a man to manage a forest property intelligently. At first, of course, it will be difficult to find competent teachers. But just as with our experimental stations, as the need came, the experimenters were gradually developed; and so we will gradually develop professors of forestry as soon as a beginning is made.

The proposed appropriation of \$5,000 to each college being for forestry purposes, i. e., for instruction and for providing the necessary object lessons in the field, the application of the fund may be at first more in the one or the other direction as opportunity exists, latitude being given to apply the same either to more cursory or to fuller courses of instruction, or else to experimental forest planting or acquisition and management of experimental forest areas, with a view of making the courses more useful in the future. Each college, of course, will find its needs and opportunities somewhat different, and hence this latitude is desirable. The fact that floral, climatic, and forestry conditions differ so much through the Union makes it preferable to have each State take up the subject separately rather than to concentrate the course into one school.

In order, however, to promote the education of forestry teachers, it is proposed to establish in connection with the Division of Forestry, in the Department of Agriculture, a post graduate school of forestry, the object of which is to give to students of forestry coming from the agricultural colleges or elsewhere an opportunity to amplify their knowledge, broaden their ideas, and give them a wider insight into the conditions, requirements, and relations of the whole country in regard to forestry, and also to prepare them for a profitable brief course of study on the Continent, where forestry methods have been applied for a long time and where object lessons alone can be had.

This National School of Forestry is not conceived to be a separate institution of the nature of a college with set school methods, but rather an opportunity to pursue special studies, the officers of the Division of Forestry and officers of other divisions of the Department related to forestry science (Soil Physics, Botany, Vegetable Pathology, etc.) giving direction to such studies and delivering united courses of lectures of an advanced character.

Forestry means the management of a forest for profit. The man who undertakes this must be a manager; he must not only know theories and principles, but must be capable of their application. Such application can not be found as yet in the United States, and since the results of forestry methods are visible only after many years, a considerable time must elapse before such object lessons can be established. The proposition, therefore, is made to create traveling scholarships for the best two students from the National School of Forestry after a test by examination, which scholarships shall entitle them to a year's sojourn travel in Europe for the purpose of familiarizing themselves with the methods of forest management in vogue, the application in practice of principles with which they have become acquainted in theory. In this way it will be possible in a few years to create a sufficient number of competent teachers as well as managers. There is now, besides the general urgent need for forestry education on account of the important bearing on the welfare of the country, an additional reason why the General Government should provide for such educational facilities.

Within the last three years the General Government has adopted a new policy with reference to its timber lands by setting aside forest reservations. That policy bids fair to be extended until all the public timber lands are so reserved. Such reservations, as a matter of course, predicates that these lands are to be managed upon

rational forestry principles, and skilled foresters will therefore be needed to carry on such management.

Since the proposition has been made that the Army should be employed to protect the forest reservations against fire and theft, at least temporarily, until an effective civil administration can be instituted, it appeared desirable that, should this policy prevail, the officers in command of such patrolling service should have some knowledge as to what is involved in it, and a short course of lectures at West Point for this purpose is provided in the proposed legislation. In this system of forestry education there is, however, one need not provided for, one of the greatest needs at the present time, namely, an opportunity for the men who work in the woods—the ones who cut the forest and who, by their manner of doing it, can either benefit or destroy the young crop, the foremen of the loggers' crews—to become acquainted with the elementary principles of forestry. A short course of instruction at such times of the year when they are at leisure will be most helpful in bringing about improvement of methods in the woods. When competent teachers, familiar with theory and practice have grown out of the system of education proposed by the present legislation, such instruction also should be furnished at the agricultural colleges or in special summer schools.

Once more I desire to impress upon the committee that the time element in the problems of forestry reform is a most important one, and that the time is ripe to prepare in this manner—by increasing knowledge on the subject, by technical education of forest managers—for the emergencies of the future. As surely as in other countries, so in ours, the necessity for the systematic reproduction and management of wood crops is bound to come; to prepare for that emergency the two bills have been drafted, and I hope the committee will be able to report favorably on them.

Mr. HAINER. I will ask Mr. Fernow if it is not a fact that these propositions have the indorsement of the American Forestry Association.

Mr. FERNOW. The matter was discussed at the annual meeting of that association and was naturally favorably considered. Besides, the presidents of the various colleges and the professors now in charge of such forestry courses as they exist have expressed themselves almost unanimously and with enthusiasm with regard to the provisions of the two bills.

Thereupon the committee adjourned.



